

Squamous Cell Carcinoma of the Alveolar Ridge and Palate

A 15-year Survey

SUZANNE T. ILDSTAD, M.D.,* MARY ELLEN BIGELOW, B.S., JOHN P. REMENSNYDER, M.D., F.A.C.S.

A retrospective review of 82 patients treated at the Massachusetts General Hospital from 1962 through 1976 for squamous cell carcinoma of the maxillary and mandibular alveolar ridge and soft and hard palates is presented. Stage at first presentation, clinical features of the disease, analysis of current therapeutic modalities, survival statistics, and prevalence of second primary malignancies are analyzed and compared with reports from other large centers.

SQUAMOUS CELL CARCINOMAS of the maxillary and mandibular alveolar ridge and hard and soft palate are an infrequent and poorly understood group of lesions. Most reported series are too small to allow statistically significant analysis. As a result, our understanding of the natural history of the disease and response to current therapy remains limited, and there is little agreement among institutions with respect to optimal combinations of currently accepted therapeutic modalities. Absolute 5-year survival rates have been noted to improve moderately over time, from 19% (1929–1936)¹ to 36% (1960–1975)² for carcinoma of the palate and from 27% (1929–1935)³ to 50% (1942–1961)⁴ for carcinoma of the alveolar ridge. However, it is clear from these relatively low survival rates that the potential for improvement is great.

The authors have chosen to analyze and compare the hard and soft palates and maxillary alveolar ridge because of their anatomic contiguity and similarities in regional lymphatic drainage. Although the mandibular alveolus is separate anatomically from the maxillary alveolus and is in continuity with the floor of the mouth, the two alveolar ridges have been combined for analysis because they have been recognized to behave in a clinically similar fashion.⁴

The hard and soft palate and alveolar ridges are compared and contrasted for clinical patterns of behavior and

From the Departments of General Surgery and Plastic and Reconstructive Surgery, Massachusetts General Hospital, Boston, Massachusetts

results of current therapeutic modalities at our institution. Recommendations are made for future approaches to treatment of this devastating disease.

Materials and Methods

A series of 82 consecutive patients who received therapy exclusively at the Massachusetts General Hospital during the 15-year period from January 1962 through December 1976 for previously untreated invasive squamous cell carcinoma of the mandibular and maxillary alveolar ridges and soft and hard palates is analyzed retrospectively. There were 53 patients with cancer of the alveolar ridge, 22 with cancer of the soft palate, and seven with cancer of the hard palate after the exclusions to be described below.

All patients with newly diagnosed histologically proven invasive squamous cell carcinoma of the upper and lower alveolar ridges and hard and soft palates were included. Ten patients with a histology other than squamous cell carcinoma were excluded from analysis (Table 1) as well as those patients with cancers involving the retromolar trigone, floor of mouth, and base of tongue. Those patients with squamous cell carcinoma *in situ* were excluded as well. Four patients with squamous cell carcinoma of the alveolar ridge, two with cancer of the soft palate, and three with cancer of the hard palate were excluded from further analysis because they had received therapy elsewhere.

Patients were staged retrospectively from information obtained from their hospital records using the TNM classification for clinical-diagnostic staging as recommended by the 1978 American Joint Committee for Cancer Staging and End Results Reporting (Table 2).⁵ This system allows further grouping of patients into Stages I through IV (Table 3).⁵ All patients had sufficient data in their

* Clinical Fellow in Surgery, Massachusetts General Hospital and Medical Staff Fellow, National Institutes of Health.

Reprint requests: John P. Remensnyder, M.D., Department of Plastic and Reconstructive Surgery, Massachusetts General Hospital, Fruit Street, Boston, MA 02114.

Submitted for publication: September 28, 1983.

TABLE 1. *Tumors with Histology Other Than Squamous Cell Carcinoma*

Alveolar Ridge (n = 3)	Soft Palate (n = 3)	Hard Palate (n = 4)
Fibrosarcoma of mandible (1)	Adenoid cystic carcinoma (1)	Adenoid cystic carcinoma (3)
Undifferentiated carcinoma (1)	Transitional cell carcinoma (1)	Adenocarcinoma (1)
Acinic cell carcinoma (1)		

records for complete staging. Patients were followed for a minimum of 5 years, or until death. There was a 100% complete follow-up through December 1981. The term "early disease" refers to patients with Stage I and II disease and "advanced disease" to those with Stage III and IV disease.

The mandibular alveolus or lower gingival ridge consists of the soft tissue overlying the bony structure of the mandible. Lymphatics from this region drain into a rich plexus with lateral collecting vessels that follow the trunks of the anterior facial vein, coursing through the submandibular nodes to the upper internal jugular chain.⁶ The maxillary alveolus, or lower gingival ridge, is defined as the soft tissues overlying the bony framework of the maxilla.

The palate, which extends from the dental arch back to the posterior free edge, is divided into two sections: the hard palate, comprising the anterior two-thirds of the total surface area of the palate, and the soft palate, or posterior third. Only the hard palate contains simple sal-

ivary glands, which are numerous. Both the soft and hard palates merge with the maxillary alveolus, sharing a common lymphatic drainage pattern. The lymphatics of the palate and maxillary alveolus follow two pathways: a) an anterior and middle pathway coursing through the retro-molar region, at times via the submandibular nodes, to the upper internal jugular chain and b) a posterior pathway coursing through the posterior tonsillar pillar to the retropharyngeal nodal area and finally into the internal jugular chain.⁶

Because of small sampling size, survival is reported as absolute survival. This method reflects per cent of patients surviving to a specified interval following initiation of therapy.

Treatment

Patients received therapy on an individual basis. "Initial therapy" refers to the first attempt to control the lesion. "Secondary therapy" refers to further therapeutic measures employed in those patients with progressive or recurrent disease. "Control of disease" refers to absence of clinically apparent disease as determined by physical examination or other testing. "Supraclavicular disease" refers to local disease and/or cervical nodal disease and is synonymous with "regional disease."

Three forms of initial therapy were most commonly utilized: surgery, radiation therapy, or combined therapy. Occasionally, chemotherapy was used for advanced disease in attempted palliation.

Alveolar ridge. Surgery for Stage I and II squamous cell carcinoma of the alveolar ridge usually consisted of wide local excision without elective therapy to the neck. Radiation alone for early stage disease consisted of 6000 to 8000 rad of fractionated external beam therapy directed at the primary tumor, again without elective therapy to the neck fields. Combined therapy consisted of preoperative external beam irradiation directed at the primary lesion followed by wide local excision of the primary lesion, again without elective therapy to the neck in most instances. Treatment for advanced disease (Stage III and

TABLE 2. *TNM Clinical-Diagnostic Classification*

Primary tumor (T)	
T1	Greatest diameter of primary tumor less than or equal to 2 cm
T2	Greatest diameter of primary tumor greater than 2 cm but less than or equal to 4 cm
T3	Greatest diameter of primary tumor greater than 4 cm
T4	Massive tumor greater than 4 cm in diameter with deep invasion to involve antrum, pterygoid muscles, base of tongue, or skin of neck
Status of cervical nodes (N)	
N0	No clinically positive nodes
N1	Single clinically positive homolateral node 3 cm or less in diameter
N2	Single clinically positive homolateral node more than 3 cm but not more than 6 cm in diameter or multiple clinically positive homolateral nodes, none more than 6 cm in diameter
N3	Massive homolateral nodes, bilateral nodes, or contralateral node(s)
Distant metastases (M)	
M0	No (known) distant metastases
M1	Distant metastases present

TABLE 3. *Clinical-diagnostic Staging of Cancer at Head and Neck Sites**

Stage	T	N	M
I	T1	N0	M0
II	T2	N0	M0
III	T3	N0	M0
	T1, T2, T3	N1	M0
IV	T4	N0, N1	M0
	Any T	N2, N3	M0
	Any T	Any N	M1

* Clinical Diagnostic Staging per the American Joint Committee for Cancer Staging and End Results Reporting, 1977.

IV) was usually by combined therapy consisting of 1000 to 6000 rad of external beam irradiation directed at the primary tumor before surgery, occasionally accompanied by up to 7000 rad to the neck region, followed by a partial maxillectomy or partial mandibulectomy with ipsilateral radical neck dissection. Neck dissection for mandibular tumors was performed as a composite resection. Radiation therapy for advanced lesions consisted of from 4000 to 7000 rad of external beam irradiation directed at the primary lesion and ipsilateral cervical nodal lymphatics.

Soft palate. Treatment for early stage squamous cell carcinoma of the soft palate consisted of wide local excision in those patients treated by surgery alone and 6000 to 7500 rad of external beam therapy directed at the primary tumor for those treated by radiation therapy alone. Neither of these treatment groups received elective therapy to the neck. Treatment for advanced stage (Stage III and IV) carcinoma of the soft palate for those treated by radiation alone consisted of 6000 to 7900 rad of external beam therapy directed at the primary site in combination with an additional boost directed at the cervical nodal lymphatics. Combined therapy for this group consisted of 6000 to 7900 rad of external beam therapy directed at the primary lesion followed by ipsilateral radical neck dissection.

Hard palate. Treatment of patients with Stage I and II squamous cell carcinoma of the hard palate consisted of a partial maxillectomy without accompanying elective therapy to the neck. Of the two patients with advanced disease, one received radiation therapy alone and the other was treated by surgery alone consisting of partial maxillectomy and ipsilateral radical neck dissection.

Results

Squamous cell carcinoma of the maxillary and mandibular alveolar ridge comprised 9% (53/592) and those of the soft and hard palates 4% (22/592) and 1% (7/592),

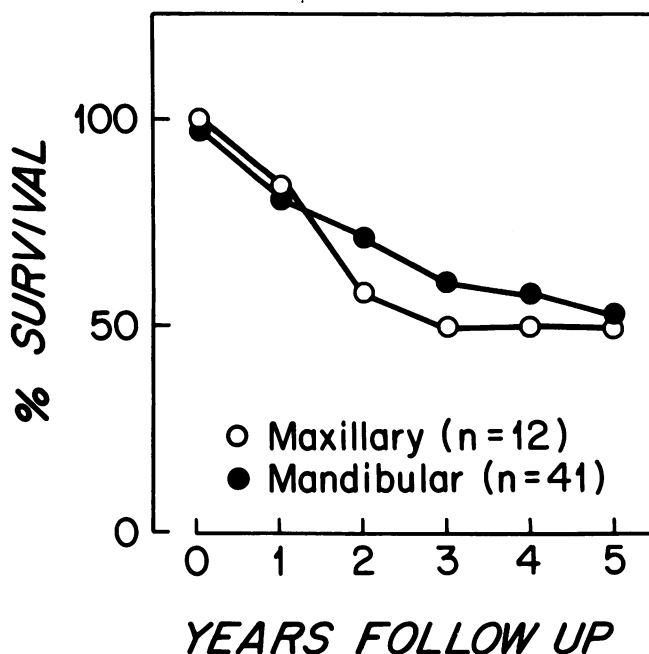


FIG. 1. Absolute overall survival comparing maxillary and mandibular alveolar ridge. Difference in survival not statistically significant.

respectively, of all newly diagnosed squamous cell malignancies of the oral cavity treated at the Massachusetts General Hospital from January 1962 through December 1976. Because patients with squamous cell carcinoma of the maxillary and mandibular alveolus had the same characteristics with respect to survival (Fig. 1), response to therapy, sex, and age distribution in our series, these two sites have been analyzed together and will be referred to collectively as "alveolar ridge."

Patients ranged in age from 21 through 84 years for all locations, without difference between anatomic sites. The majority of patients presented in their sixth decade or later (Fig. 2). Women comprised 49% of all patients with carcinoma of the alveolar ridge, 45% of those with

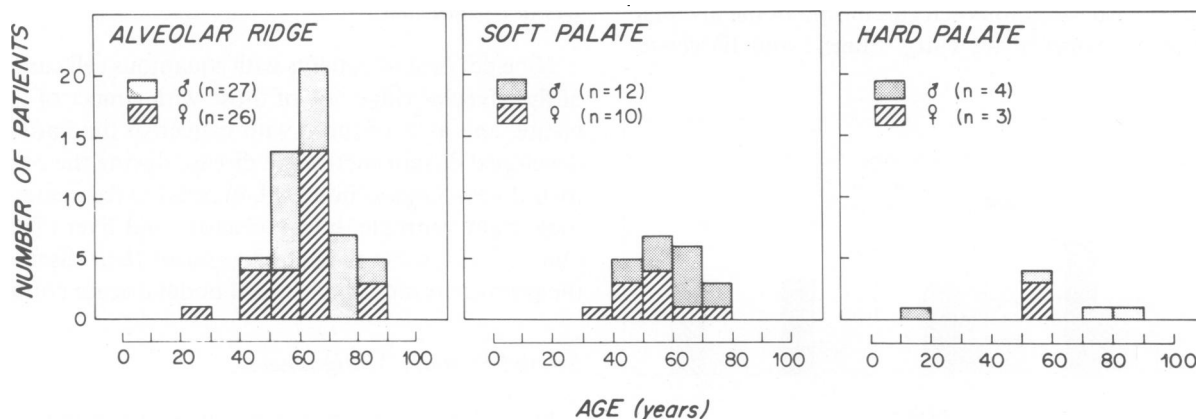


FIG. 2. Age distribution at initial presentation by decade for alveolar ridge, soft palate, and hard palate.

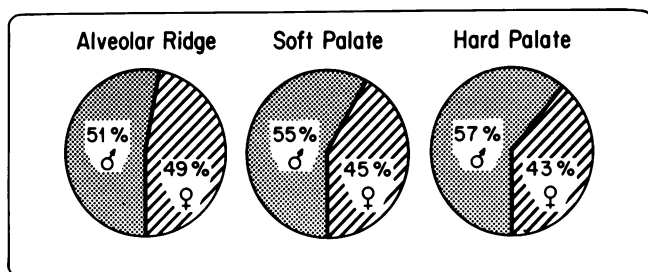


FIG. 3. Sex distribution for alveolar ridge, soft palate, and hard palate.

carcinoma of the soft palate, and 43% of those with carcinoma of the hard palate (Fig. 3). The age distribution and stage at initial clinical-diagnostic staging was not significantly different for men or women (Fig. 2).

Ninety per cent of patients with squamous cell carcinoma of the alveolar ridge and 100% of those with carcinoma of the hard palate presented with Stage I, II, or III lesions. In contrast, only 64% of patients with carcinoma of the soft palate presented with Stage I, II, or III lesions (Fig. 4).

Surgery was the primary method of treatment for early stage carcinoma of the alveolar ridge (19/28, 68%). Patients with advanced disease were treated primarily by combined therapy (11/25, 44%) or radiation therapy alone (8/25, 32%, Table 4).

The majority of patients with early stage squamous cell carcinoma of the soft palate were treated by radiation therapy (8/12, 67%) alone and the remainder were treated by surgery alone. The majority of patients with advanced disease were treated by radiation alone (8/10, 80%, Table 5).

The majority of patients with early stage carcinoma of the hard palate, on the other hand, were treated by surgery alone (4/5, 80%, Table 6).

Survival

There was a 66% 2-year and 49% 5-year overall survival for patients with squamous cell carcinoma of the alveolar ridge (Fig. 5). Survival for early (Stage I and II) *versus*

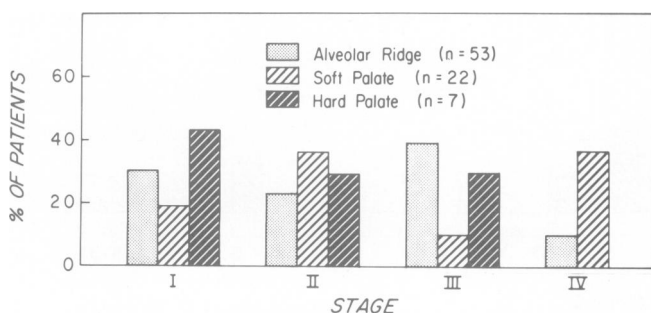


FIG. 4. Distribution of patients by stage for each location.

advanced (III and IV) disease was not significantly different in our series ($p > 0.1$, Fig. 6). As noted above, the majority of patients with advanced disease were treated by combined therapy, which appeared to achieve superior control of the disease process and may therefore have had an influence on survival. In contrast, early stage lesions were treated by surgery or radiation therapy alone. However, small sampling size makes statistical analysis unreliable. Status of cervical nodal disease on initial presentation did not appear to correlate with survival (Fig. 7). Again, one must keep in mind the possible influence of differences in treatment modalities utilized and the limitations of small sampling size in analysis.

Overall survival for squamous cell carcinoma of the soft palate was 64% at 2 years and 41% at 5 years. A similar survival was noted for carcinoma of the hard palate, where an 86% 2-year and 57% 5-year overall survival were noted (Fig. 5).

Stage of lesions at initial presentation had less prognostic significance than status of cervical nodes for carcinoma of the soft and hard palate. There was a 61% and 100% 2-year and 50% and 42% 5-year survival for early stage (Stage I and II) cancers of the soft and hard palate respectively *versus* a 68% and 50% 2-year and 44% and 20% 5-year overall survival for advanced stage (Stage III and IV) disease (Fig. 6).

Presence or absence of cervical nodal disease on initial clinical evaluation was clearly of prognostic significance for carcinoma of the soft and hard palate (Fig. 7). There was an 85% 2-year and 54% 5-year survival for T1N0, T2N0, and T3N0 lesions in cancer of the soft palate and 100% 2-year and 69% 5-year survival for similar lesions of the hard palate. This is in striking contrast to a 33% 2-year and 11% 5-year and 0% 2-year and 5-year survival for patients with squamous cell carcinoma of the soft and hard palate, respectively, who presented at initial clinical-diagnostic staging with evident cervical nodal metastatic disease (Fig. 7).

Distant Metastases

Nine per cent of patients with squamous cell carcinoma of the alveolar ridge, 9% of those with cancer of the soft palate, and 14% of those with cancer of the hard palate developed distant metastatic disease during the course of their illness. Organs involved, in order of frequency, were lung, right ventricle, bony skeleton, and liver (Table 7). Only 37% of these patients developed their disease with the primary tumor and cervical nodal disease controlled.

Second Primary Malignancies

Second metachronous or synchronous primary malignancies occurred in 15% of patients with squamous cell

TABLE 4. *Maxillary and Mandibular Alveolus: Analysis of Current Treatment Modalities*

Initial Therapy	Stage	Number of Patients	Regional Control Following Initial Therapy	Response to Secondary Therapy	Overall Control of Regional Disease
Surgery	I	13	6/13 (46%)	3/7 (43%)	9/13 (69%)
	II	6	3/6 (50%)	1/3 (33%)	4/6 (67%)
	III	5	3/5 (60%)	1/2 (50%)	4/5 (80%)
	IV	1	Operative death	NA	NA
Radiation	I	0			
	II	4	0/4 (0%)	2/4 (50%)	2/4 (50%)
	III	5	0/5 (0%)	2/5 (40%)	2/5 (40%)
	IV	3	0/3 (0%)	3/3 (100%)	3/3 (100%)
Combined therapy	I	3	2/3 (67%)	1/1 (100%)	3/3 (100%)
	II	2	1/2 (50%)	0/1 (0%)	1/2 (50%)
	III	10	6/10 (60%)	1/4 (25%)	7/10 (70%)
	IV	1	1/1 (100%)	NA	1/1 (100%)

carcinoma of the alveolar ridge involving eight primaries in seven different patients. Fifty per cent of the second malignancies for patients with cancer of the alveolar ridge were of squamous histology and 75% involved the supradiaphragmatic aerodigestive tract (Table 8). No second primary malignancies were noted for carcinoma of the soft or hard palate.

Treatment Failure

The most common sites of therapeutic failure were isolated local or cervical nodal disease or the two in combination in the form of persistence, progression, or recurrence of disease.

Control of regional disease following initial therapy for squamous cell carcinoma of the alveolar ridge was achieved in 43% (12/28) of patients with Stage I and II disease and 40% (10/25) of patients with Stage III and IV disease. Initial control of disease was by far superior with surgery alone for early disease (Stage I and II) and surgery or combined therapy for advanced disease (Stage III and IV) for this anatomic location. Sites of failure for

radiation therapy occurred primarily in the form of cervical nodal disease alone (50% of all radiation treatment failures) or combined local and cervical nodal disease, usually in the form of persistent local disease with concomitant progression of cervical nodal disease, while those treated with surgery had treatment failures equally distributed between local disease, cervical nodal disease, or the two in combination. Of those patients with regional therapeutic failures, 33% (7/21) with Stage I and II disease and 50% (7/14) with Stage III and IV disease responded to secondary therapy in the form of surgery and/or irradiation, for an overall regional control rate of 68% for both groups (Table 4).

Eighty-three per cent (25/30) of treatment failures for squamous cell carcinoma of the alveolar ridge occurred within the first 12 months following initiation of therapy, and 90% within the first 24 months. However, three additional failures occurred from 27 months to 9 years after initial therapy.

For squamous cell carcinoma of the soft palate, control of supraclavicular disease following initial therapy was achieved in 50% (6/12) of patients with Stage I and II

TABLE 5. *Soft Palate: Analysis of Current Treatment Modalities*

Initial Therapy	Stage	Number of Patients	Regional Control Following Initial Therapy	Response to Secondary Therapy	Overall Control of Regional Disease
Surgery	I	1	1/1 (100%)	NA	1/1 (100%)
	II	3	2/3 (67%)	0/1 (0%)	2/3 (67%)
	III	0	NA	NA	NA
	IV	0	NA	NA	NA
Radiation	I	3	2/3 (67%)	0/1 (0%)	2/3 (67%)
	II	5	1/5 (20%)	2/4 (50%)	3/5 (60%)
	III	2	0/2 (0%)	2/2 (100%)	2/2 (100%)
	IV	6	2/6 (33%)	1/4 (25%)	3/6 (50%)
Combined therapy	I	0	NA	NA	NA
	II	0	NA	NA	NA
	III	0	NA	NA	NA
	IV	2	1/2 (50%)	0/1 (0%)	1/2 (50%)

TABLE 6. *Hard Palate: Analysis of Current Treatment Modalities*

Initial Therapy	Stage	Number of Patients	Regional Control Following Initial Therapy	Response to Secondary Therapy	Overall Control of Regional Disease
Surgery	I	3	2/3 (67%)	0/1 (0%)	2/3 (67%)
	II	1	0/1 (0%)	1/1 (100%)	1/1 (100%)
	III	1	1/1 (100%)	NA	1/1 (100%)
	IV	0	NA	NA	NA
Radiation	I	0	NA	NA	NA
	II	1	0/1 (0%)	1/1 (100%)	1/1 (100%)
	III	1	0/1 (0%)	0/1 (0%)	0/1 (0%)
	IV	0	NA	NA	NA
Combined therapy	NA				

and 30% (3/10) of patients with Stage III and IV disease. Surgery alone was superior to radiation therapy alone for control of regional disease following initial therapy for Stage I and II disease. Of those patients with therapeutic failures, 33% (2/6) of those with early disease and 43% (3/7) with advanced disease were salvaged by secondary therapy. Therefore, overall control of regional disease was achieved in 67% (8/12) of those with early disease and 60% (6/10) of those with advanced disease (Table 5). Small sampling size for advanced disease (Stage III and IV) makes analysis unreliable.

As with squamous cell carcinoma of the alveolar ridge, the majority of treatment failures occurred within the

first 2 years: 55% within the first 12 months and 91% within the first 24 months following initiation of therapy. However, one patient developed a cervical nodal metastasis 4 years following initial therapy.

Control of regional disease following initial therapy was achieved in 40% (2/5) of patients with Stage I and II squamous cell carcinoma of the hard palate. Further control of disease by secondary therapy in the form of surgery or irradiation in those with initial treatment failures led to an overall regional control rate of 80% (4/5, Table 6). Small sampling size for advanced disease makes analysis unreliable.

Seventy-five per cent of therapeutic failures for those with carcinoma of the hard palate were evident within 12 months following initiation of treatment and in 100% appeared within the first 24 months.

Discussion

As was first pointed out by Martin in his classic reports in 1941 and 1942,^{1,3} most reported series dealing with squamous cell carcinoma of the alveolar ridge and palate are limited by poor patient follow-up, lack of histologic verification of malignancy, and inclusion of patients initially treated elsewhere who were referred to tertiary centers for recurrence or progression of disease. We have chosen in our series to exclude patients who received initial therapy elsewhere to assure consistency of initial staging and therapeutic approaches. This careful patient selection, while resulting in a smaller series size, has allowed complete follow-up and full access to detailed histological, clinical, and therapeutic records. The resulting analysis more accurately represents the results of therapeutic modalities utilized at our institution and permits comparisons with similarly selected patient populations from other centers.

Squamous cell carcinomas of the alveolar ridges and palate are uncommon lesions. At our institution they

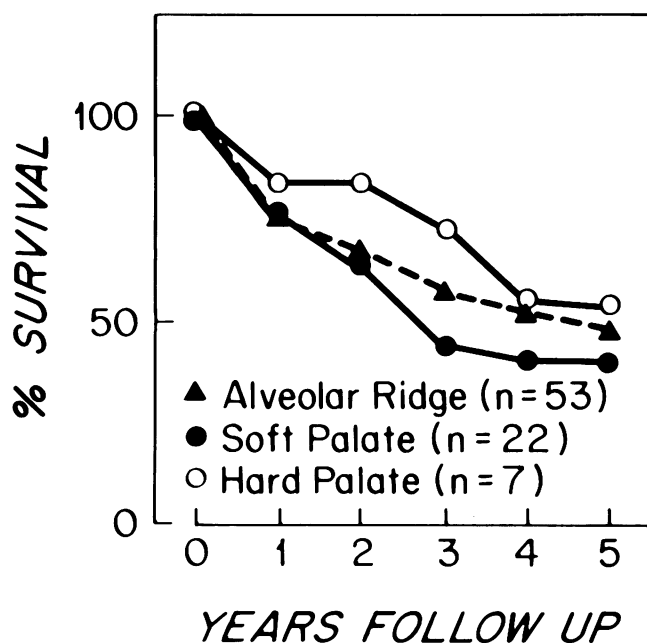


FIG. 5. Overall absolute survival in the first 5 years following treatment for squamous cell carcinoma of the alveolar ridge, soft palate, and hard palate.

comprised only 9% and 5%, respectively, of all patients with squamous cell carcinoma of the oral cavity, a distribution essentially unchanged from that reported by Martin in the early 1940s.^{1,3} Squamous cell carcinoma of the alveolar ridge and hard and soft palate remains a disease of the elderly. The majority of patients in our series and others^{1,2,4,7} presented in their sixth decade or later for all three locations. However, we noted a nearly equal ratio of women to men affected for all three locations. This is at variance with reports from previous series.^{2-4,8,9} Cady reported that 77% of patients treated at Memorial Hospital from 1942 to 1961 for squamous cell carcinoma of the alveolar ridge were male,⁴ while Evans et al. reported a 72% preponderance of men from 1960

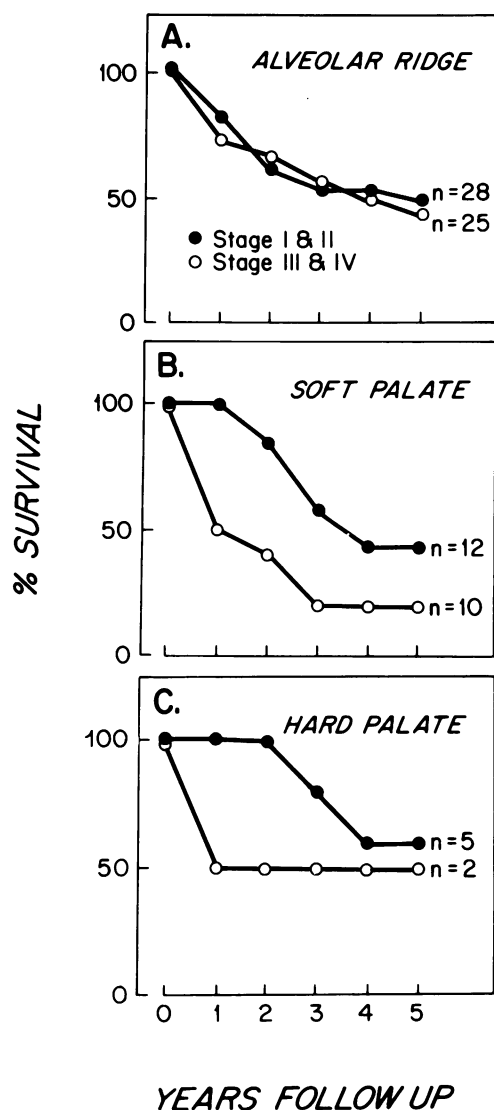


FIG. 6. Absolute survival comparing early (Stage I and II) versus advanced (Stage III and IV) disease for each location.

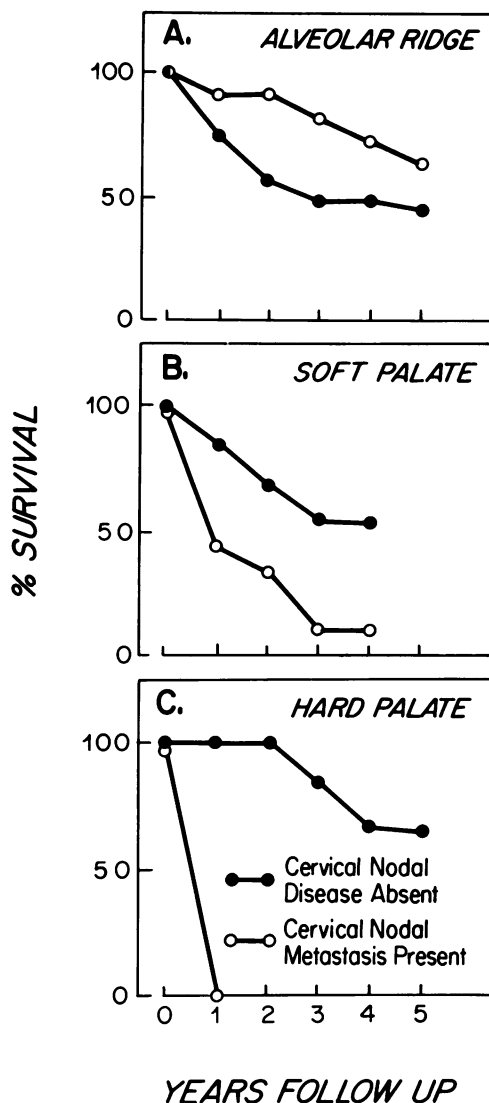


FIG. 7. Absolute overall survival comparing absence or presence of cervical nodal metastases.

to 1975 for carcinoma of the palate for the same institution.² The increased proportion of women affected by squamous cell carcinoma of these three locations follows the trend of our experience for squamous cell carcinoma of the floor of mouth and mobile tongue,^{10,11} and has been attributed by some to increased alcohol and tobacco consumption by women in the United States.¹² The Memorial experience reported by Evans for squamous cell carcinoma of the palate analyzes the same time period as our study; we have found no explanation for the difference in male to female distribution in our series compared to theirs.

The 13% prevalence of second synchronous or metachronous primary malignancies observed in patients with squamous cell carcinoma of the alveolar ridge was in

TABLE 7. *Distant Metastases*

Location of Metastases	Alveolar Ridge (n = 53)	Soft Palate (n = 22)	Hard Palate (n = 7)
Lung	3	2	1
Bony skeleton	1	0	0
Right ventricle	1	0	1
Liver	1	0	0
Total number of metastases	6	2	2
Total number of patients	5 (9%)	2 (9%)	1 (14%)

agreement with previously reported series^{3,4,8} and significantly exceeds the expected rate for second primary malignancies for the general population.¹³ However, the absence of second primary malignancies among patients in our series with carcinoma of the palate is unexpected and at variance with previous series, which have reported a 20%,¹⁴ 33%,¹⁵ 28%¹⁶ prevalence. This variation may be due to the small numbers of patients in each series.

The majority of patients with squamous cell carcinoma of the alveolar ridge and hard palate presented with Early Stage (I and II) lesions in contrast with cancer of the soft palate, in which 36% of patients initially presented with Stage IV disease. This can in part be explained by the hidden anatomic location of the soft palate in comparison with the more easily accessible hard palate and gums.

In our experience, stage at initial presentation and status of cervical nodal disease were both of prognostic significance for survival in patients with squamous cell carcinoma of the hard and soft palate, with survival decreasing with increasing stage of disease. Neither was as reliable a prognosticator for carcinoma of the maxillary and mandibular alveolar ridge. In fact, survival for patients with carcinoma of the alveolar ridge with clinically positive cervical nodal disease was slightly superior to that for patients without nodal disease. As was noted previously, the majority of patients with advanced stage disease were

treated by combined therapy, while those with early disease received primarily surgery or radiation therapy alone. This difference in therapeutic approach may have an impact on survival, however, small sampling size makes analysis unreliable.

Survival for patients with squamous cell carcinoma of the alveolar ridge was similar to that reported by other large centers.^{4,8} Similarly, our 41% 5-year survival for squamous cell carcinoma of the soft palate and 54% for cancer of the hard palate is only slightly superior to that reported by other institutions since the 1940s.^{2,9} For these locations, this is not a significant improvement since the 1940s when the trend in therapy changed from primarily radiotherapy to surgery or combined therapy.³

Supraclavicular disease, in the form of local and/or cervical nodal disease, continues to be the most frequent site of therapeutic failure. In our series, only 17% (8/47) of treatment failures involved distant metastatic disease and in only two-thirds of these patients were the primary tumor and cervical nodal disease controlled. The authors therefore feel strongly that the primary therapeutic goal should be to attain control of regional disease. The value of aggressive management for those failing initial therapy also cannot be overemphasized. Forty-six per cent (21/46) of patients who failed initial therapy responded to secondary attempts at control of disease.

Although the majority of therapeutic failures for all locations appeared within the first 24 months following initiation of therapy, long-term close follow-up is imperative, since some recurrences did not appear until up to 9 years following initial therapy. One could argue that recurrences appearing after a finite period of time could be considered second primary cancers; nonetheless, we strongly encourage long-term close follow-up in order to achieve early diagnosis and treatment both of recurrences and new primary malignancies in this squamous cell cancer-prone patient population.

In our series, initial control of regional disease was superior in patients treated by surgery alone for early stage squamous cell carcinoma of the alveolar ridge. Surgery or combined therapy appeared to be superior for those with advanced disease, however, small sampling size limited the analysis. Small sampling size in each treatment group made analysis of carcinoma of the hard and soft palate unreliable.

Our series has the same limitations inherent in retrospective analyses in small patient populations as previous reports from other large centers. Few studies reported to date have had sufficient numbers of patients for statistically meaningful comparisons of disease control and survival for different therapies. Studies have been further limited by the restrictions of nonrandomized as-

TABLE 8. *Second Primary Malignancies—Alveolar Ridge*

Location	Number of Patients	Histology
Rectum	1	Adenocarcinoma
Lung		Undifferentiated carcinoma
Forehead	1	Melanoma
Buccal mucosa	1	Squamous cell carcinoma
Lung	2	Squamous cell carcinoma
Buttock	1	Liposarcoma
Upper lip	1	Squamous cell carcinoma
Total	7/53 (13%)	

signment to therapy. The authors strongly urge the formation of multicenter cooperative prospective protocols in order to properly evaluate the effectiveness of currently accepted therapeutic approaches.

References

1. Martin HE. Tumors of the palate. *Arch Surg* 1942; 44:599-635.
2. Evans JF, Shah JP. Epidermoid carcinoma of the palate. *Am J Surg* 1981; 142:451-455.
3. Martin HE. Cancer of the gums (gingivae). *Am J Surg* 1941; 54:765-806.
4. Cady B, Catlin D. Epidermoid carcinoma of the gum (a 20 year survey). *Cancer* 1969; 23:551-569.
5. American Joint Committee for Cancer Staging and End Results Reporting. *Manual for Staging of Cancer*. Chicago, Illinois, 1978.
6. Haagensen CD, Feind CRL, Herter FP, et al. *The Lymphatics in Cancer*. Philadelphia: WB Saunders, 1972; 59-230.
7. Ratzer ER, Schweitzer RJ, Frazell EL. Epidermoid carcinoma of the palate. *Am J Surg* 1970; 119:294-297.
8. Erich JB, Kragh LV. Results of treatment of squamous cell carcinoma arising in mandibular gingiva. *AMA Archives of Surgery* 1959; 79:112-117.
9. Fee WE Jr, Schoepel SL, Rubenstein R, et al. Squamous cell carcinoma of the soft palate. *Arch Otolaryngol* 1979; 105:710-718.
10. Ildstad ST, Bigelow ME, Remensnyder JP. Intra-oral cancer at the Massachusetts General Hospital: squamous cell carcinoma of the floor of the mouth. *Ann Surg* 1983; 197:34-41.
11. Ildstad ST, Bigelow ME, Remensnyder JP. Squamous cell carcinoma of the mobile tongue: clinical behavior and results of current therapeutic modalities. *Am J Surg* 1983; 145:443-449.
12. Vincent RG, Marchetta F. The relationship of the use of tobacco and alcohol to cancer of the oral cavity, pharynx, or larynx. *Am J Surg* 1963; 106:501-505.
13. Schottenfeld D, Fraumeni JF Jr, eds. *Cancer Epidemiology and Prevention*. Philadelphia: WB Saunders, 1982.
14. Konrad HR, Canalis RF, Calcaterra TC. Epidermoid carcinoma of the palate. *Arch Otolaryngol* 1978; 104:208-212.
15. Jacques DA. Epidermoid carcinoma of the palate. *Otolaryngologic Clinics of North America* 1979; 12:125-128.
16. Chung CK, Constable WC. Squamous cell carcinoma of the soft palate and uvula. *International Journal of Radiation Oncology, Biology and Physics* 1979; 5:845-850.